

Evaluation on the Predictability of Seasonal Tropical Storm Activities in the NCEP CFSv2

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NOAA/NWS/NCEP/CPC

CFSv2 Evaluation Workshop

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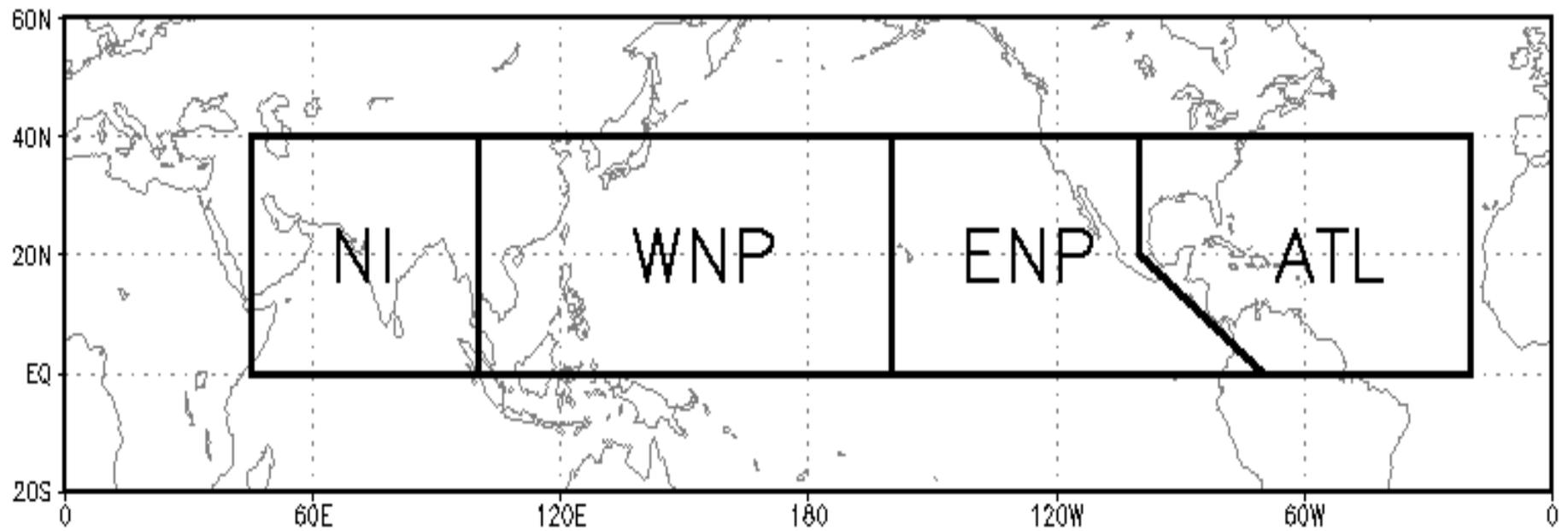
Datasets

- CFS v2 Hindcasts
 - 16 Members: April 11th, 16th, 21st, 26th at 00, 06, 12, 18Z
 - 28 Years: 1982-2009
- CFS Hindcasts at T382
 - 5 Members: April 19-23 at 00Z
 - 28 Years: 1981-2008
- Months: May-November
- Time Interval: 6 hours
- Resolution: 1 x 1 degree grid
- Observations from HURDAT and JTWC Best Track Dataset
 - Tropical depressions and subtropical storms are not included in the storm count.

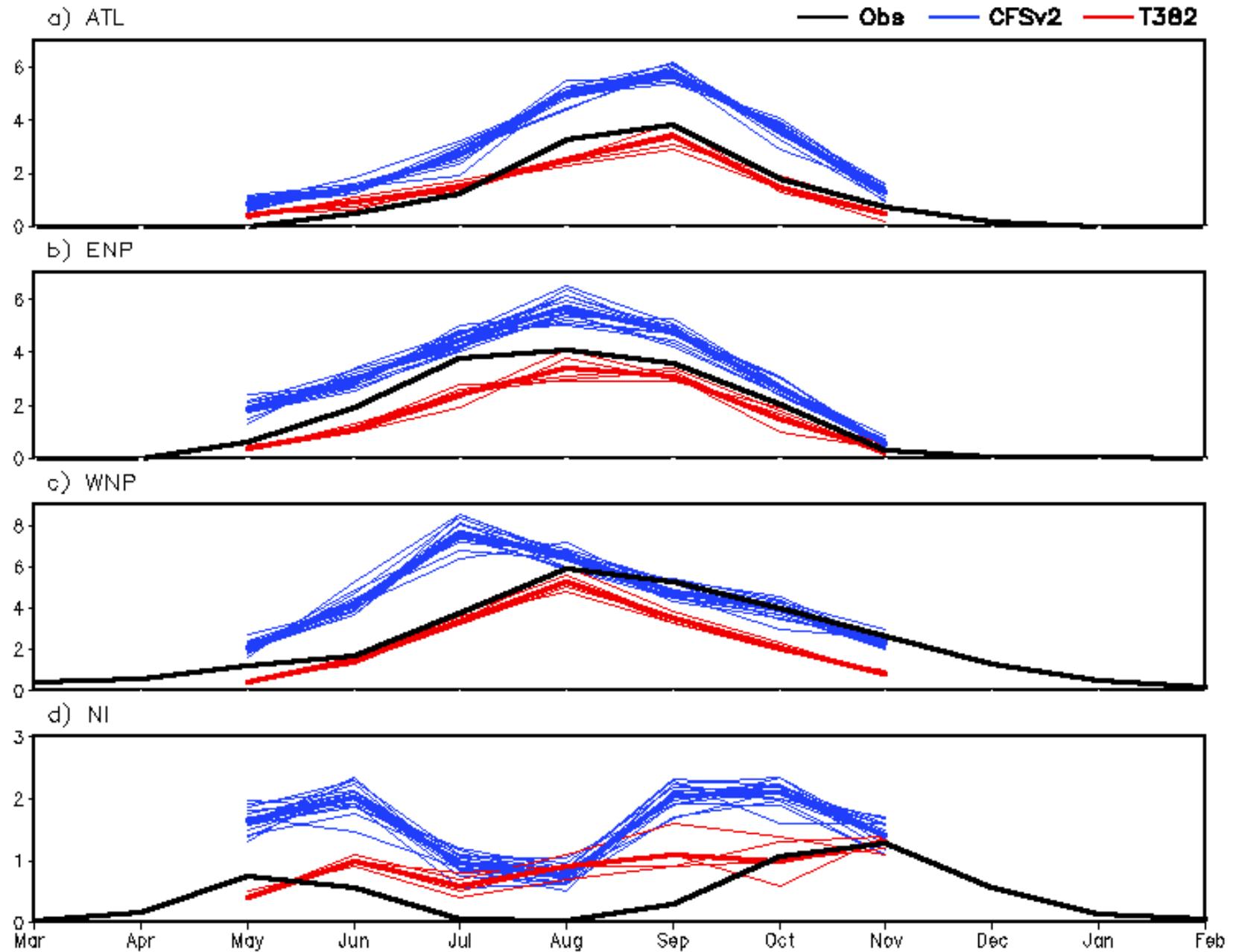
Detection & Tracking Methods

- Method based on Camargo & Zebiak (2002)
 - Point must meet 7 criteria to be considered a storm
 - Ex: Minimum pressure, warm-core system
- Using detection thresholds unique to CFS version and basin
- Vorticity threshold used for tracking = $3.5 \times 10^{-5} \text{ s}^{-1}$ (Atlantic)

Four NH Ocean Basins



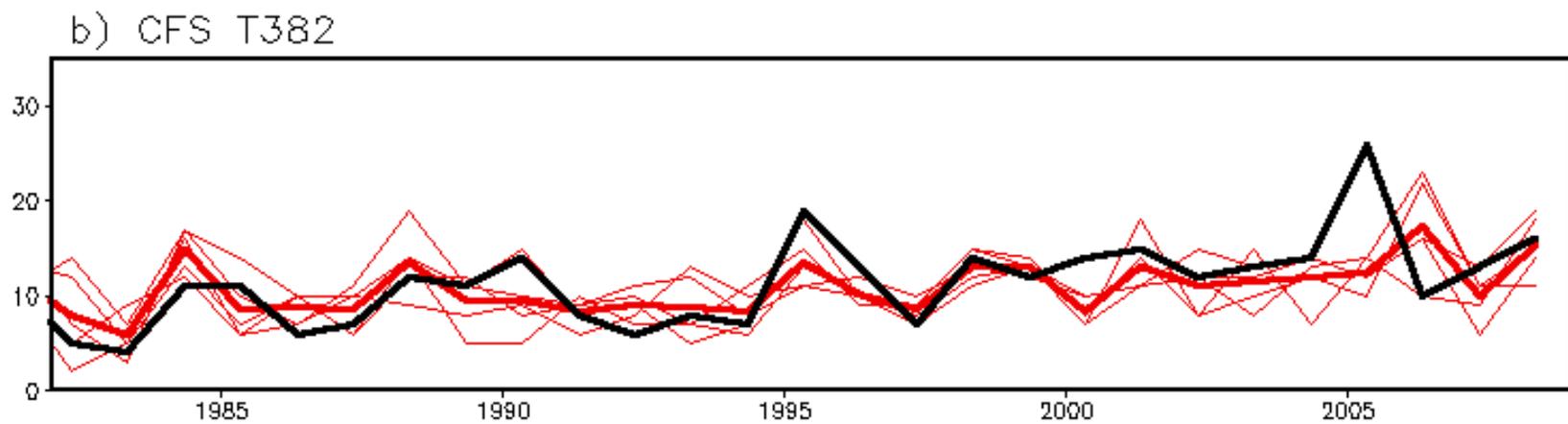
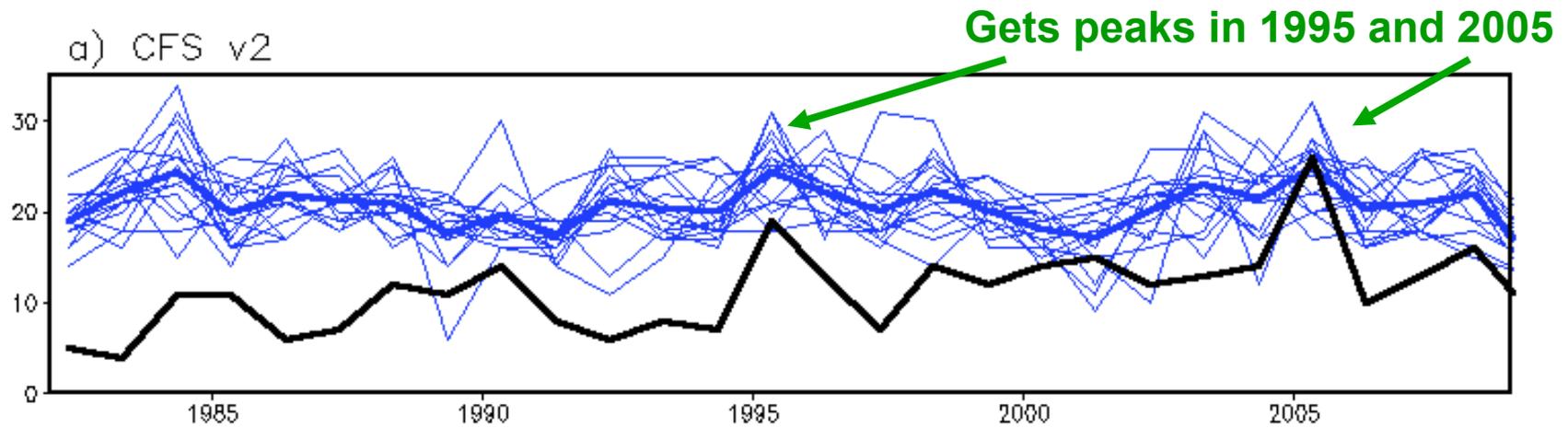
Seasonal Cycle of TS Numbers



Average Storm Count
May - Nov

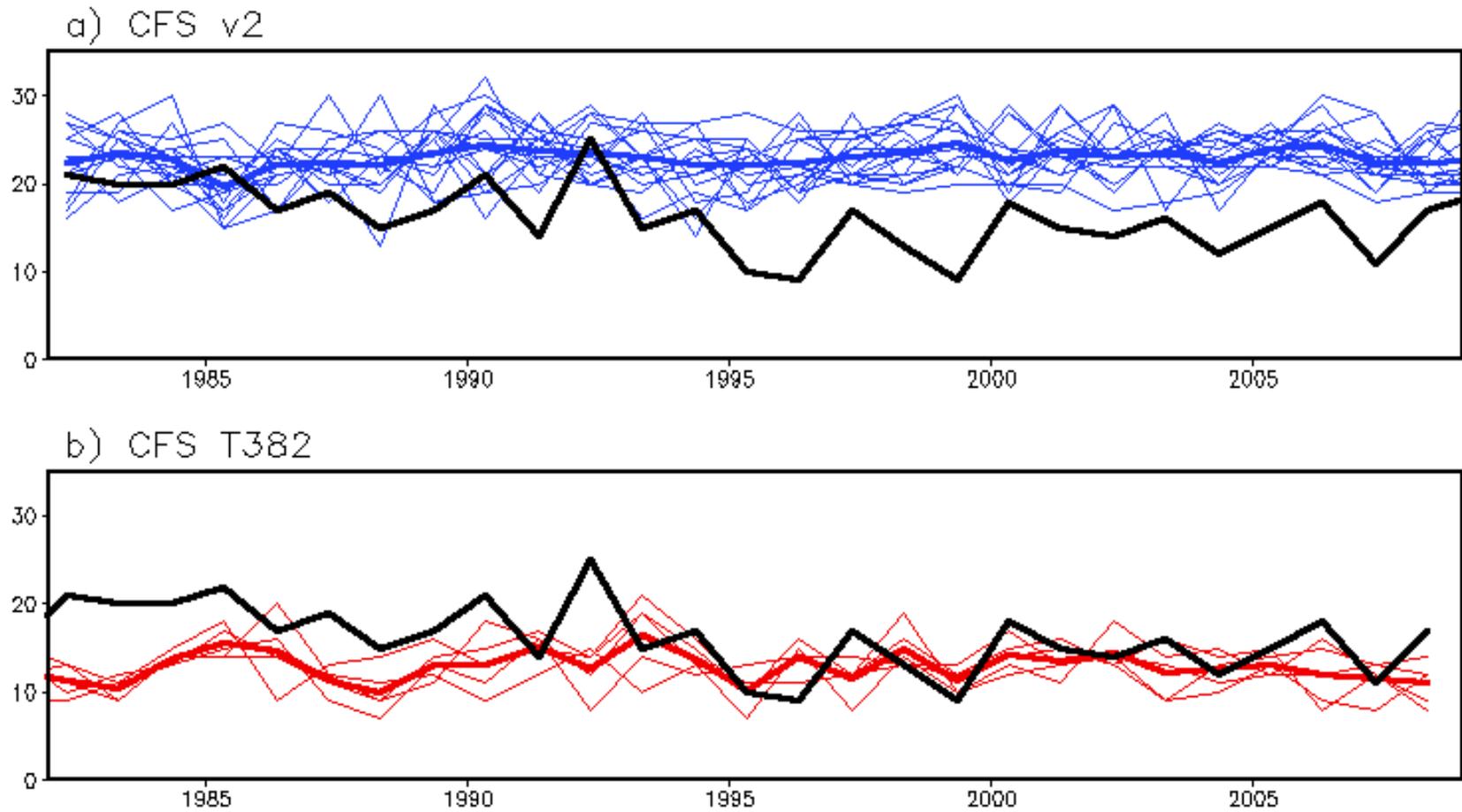
	Observed	CFS v2	CFS T382
ATL	11.3	20.7	10.9
ENP	16.4	23.0	12.9
WNP	27.4	31.5	18.0
NI	4.0	11.0	6.7

ATL Interannual Variability



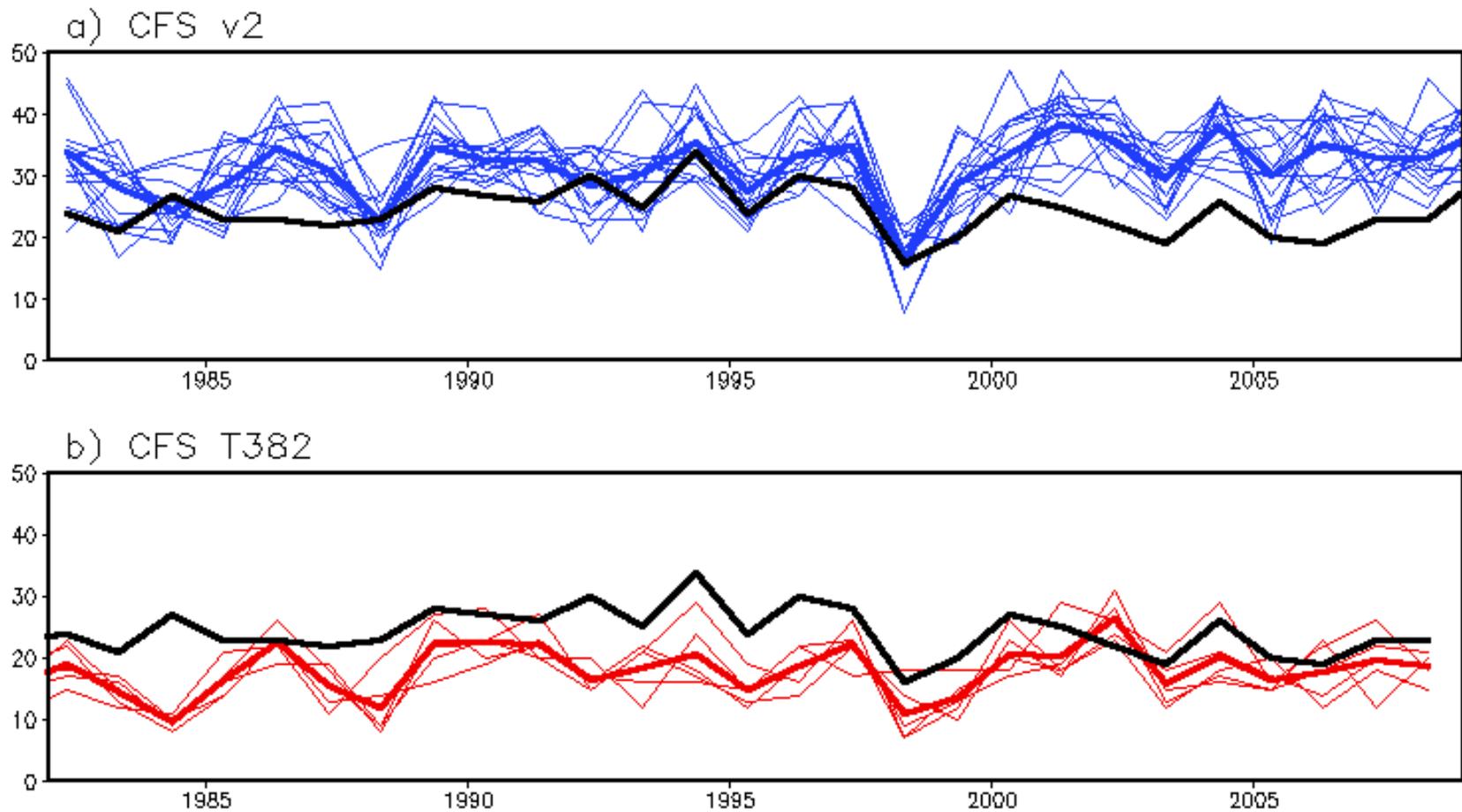
Spearman Rank Correlation
CFSv2 = 0.23, CFS T382 = 0.61

ENP Interannual Variability



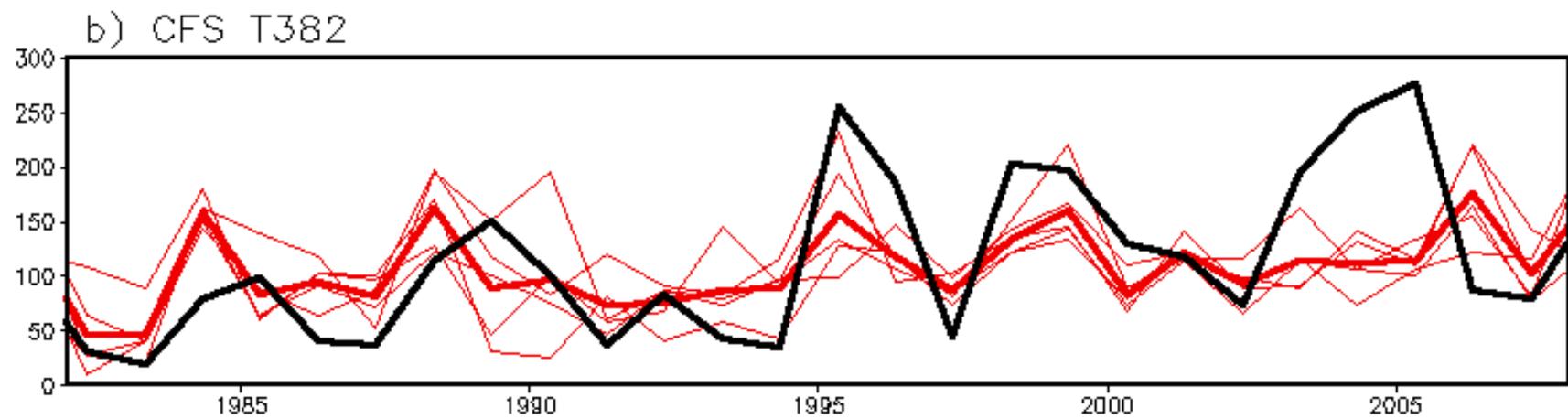
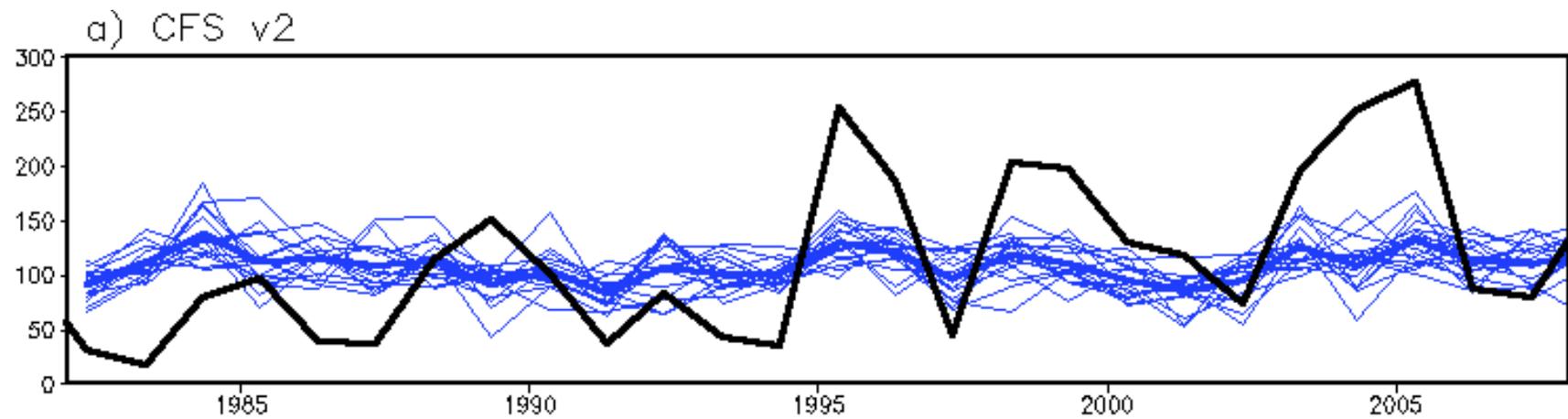
Spearman Rank Correlation
CFSv2 = -0.007, CFS T382 = -0.04

WNP Interannual Variability



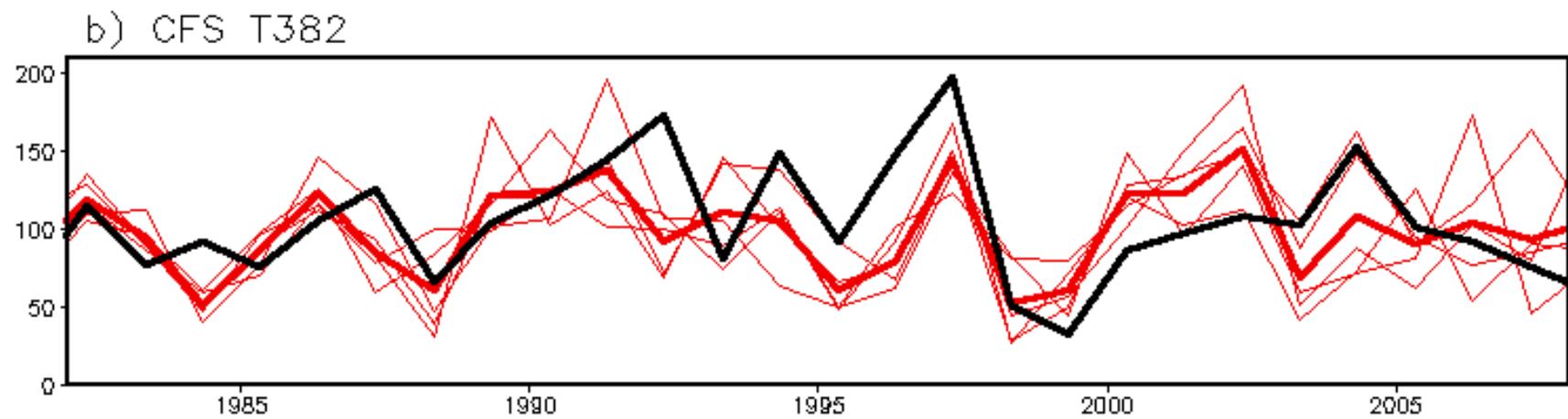
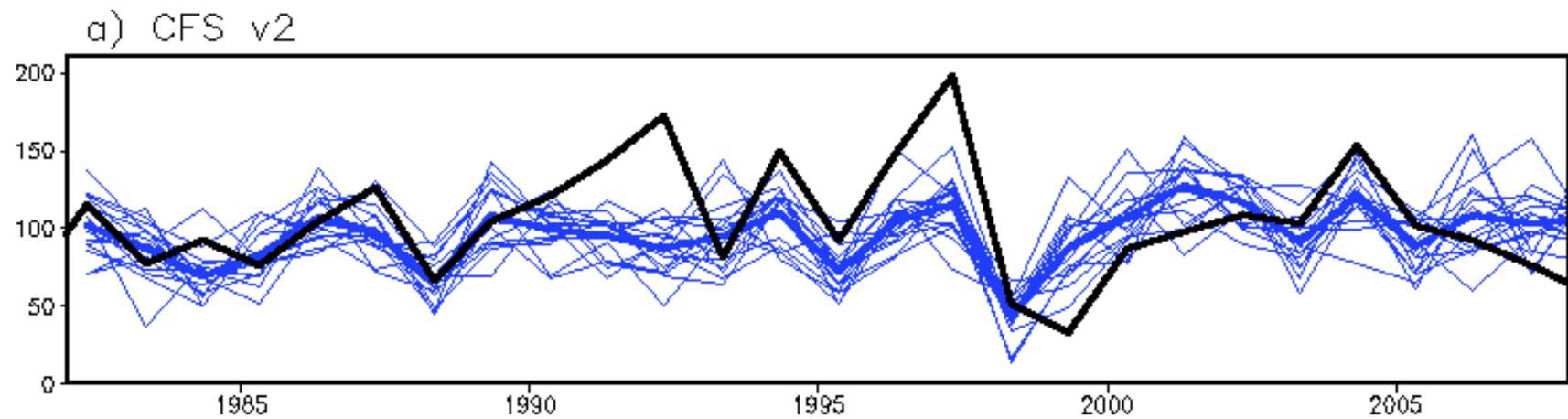
Spearman Rank Correlation
CFSv2 = 0.37, CFS T382 = 0.46

ATL ACE Index - % of Median



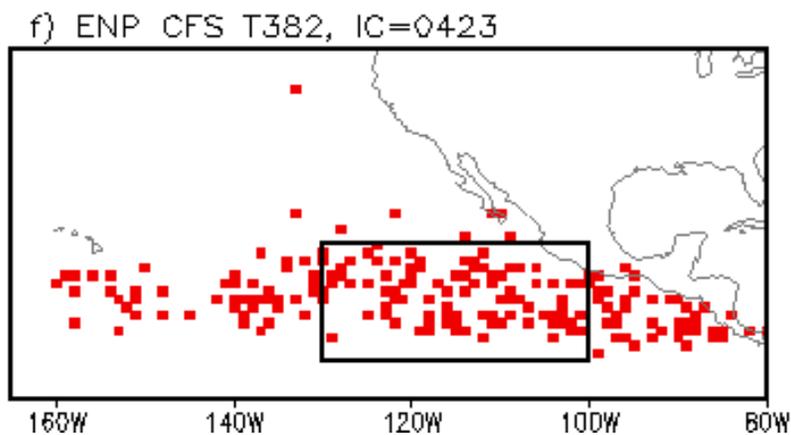
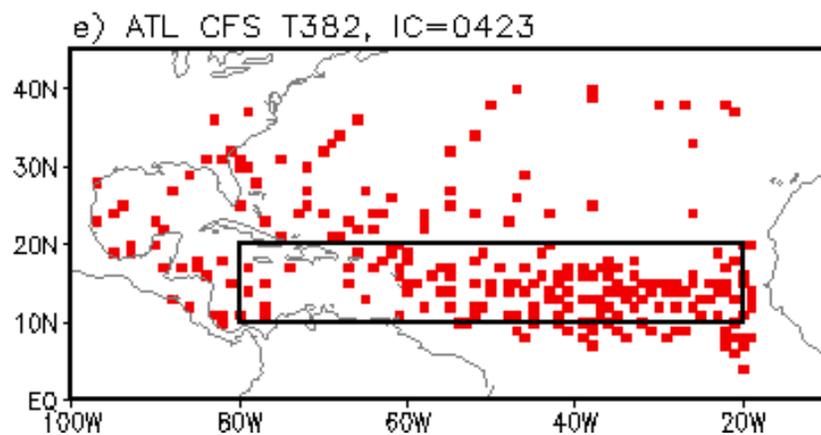
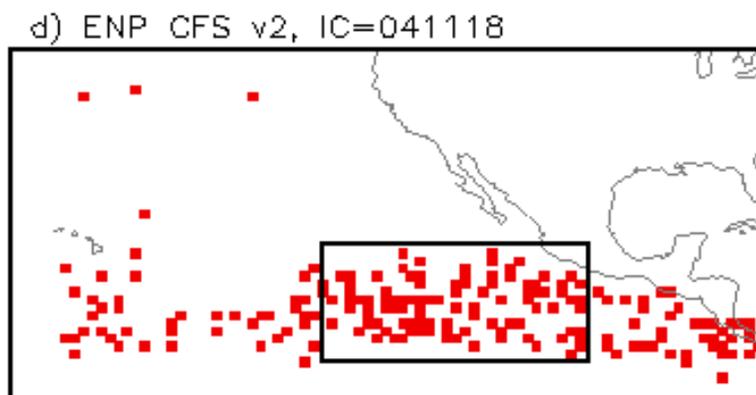
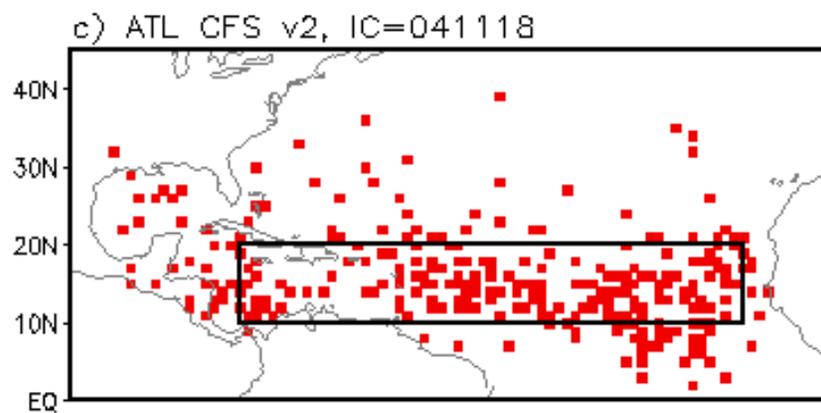
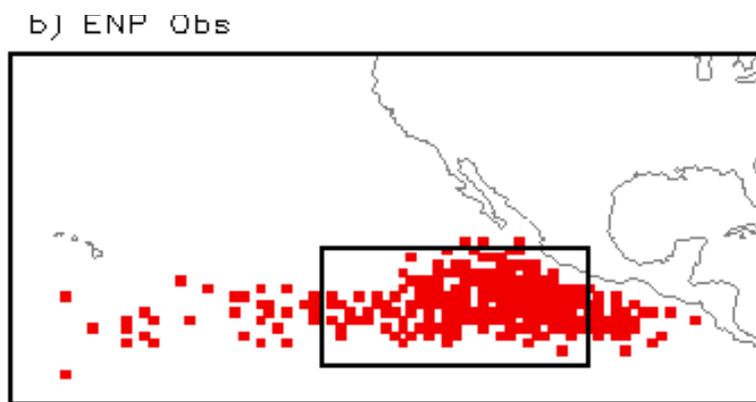
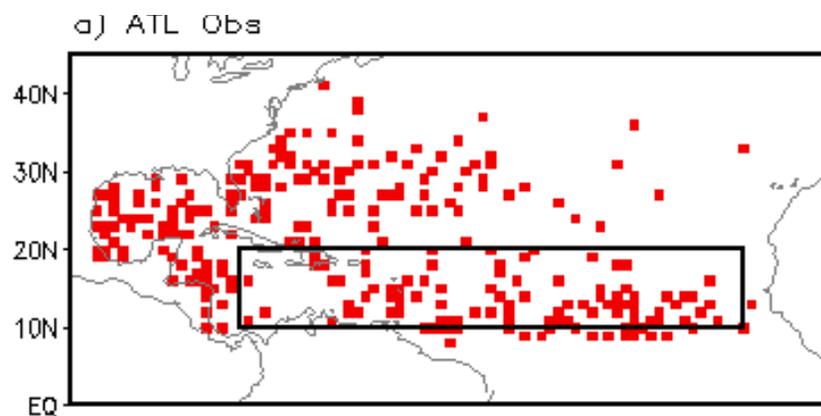
Spearman Rank Correlation
CFSv2 = 0.47, CFS T382 = 0.62

WNP ACE Index - % of Median



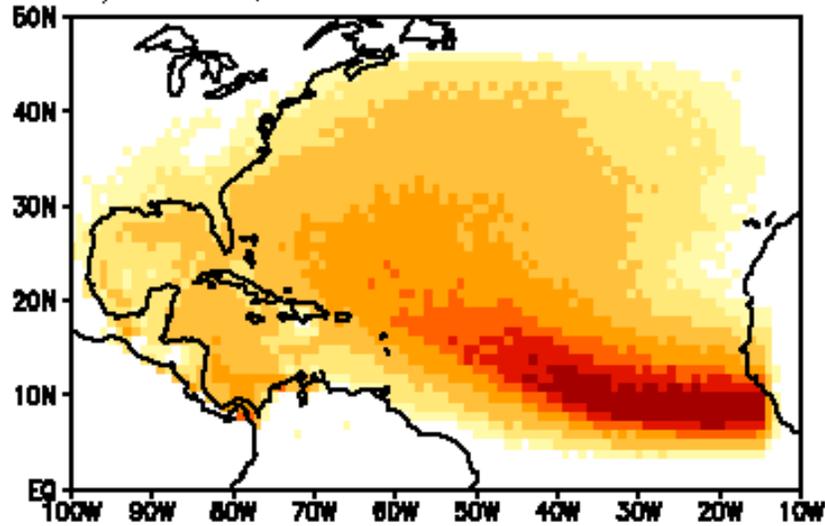
Spearman Rank Correlation
CFSv2 = 0.42, CFS T382 = 0.48

Tropical Storm Origins, May-Nov

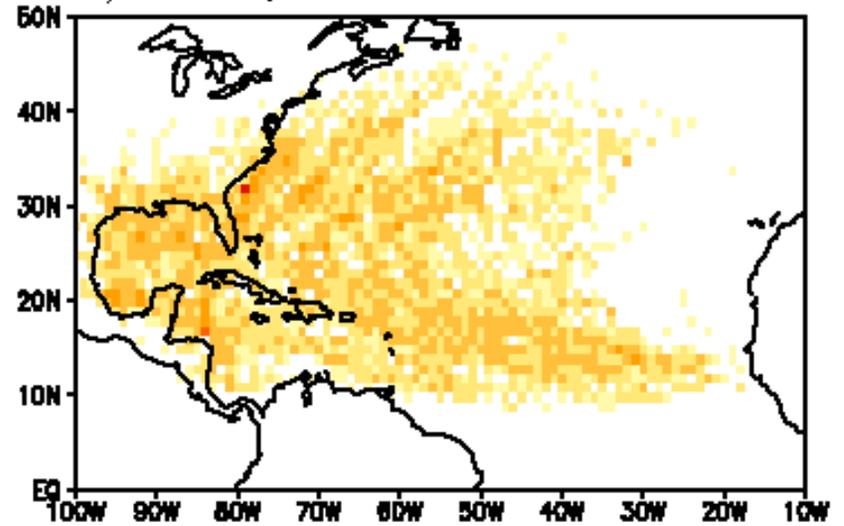


Storm Track Density

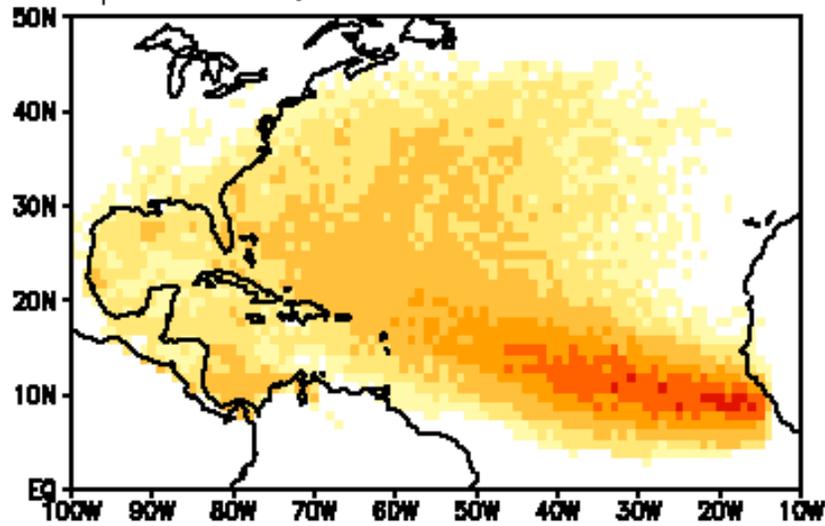
a) CFS v2, 1982–2009



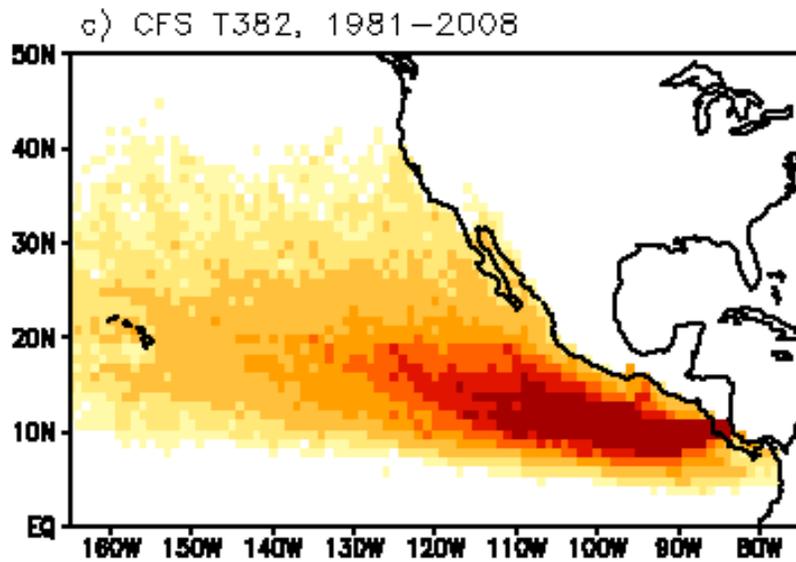
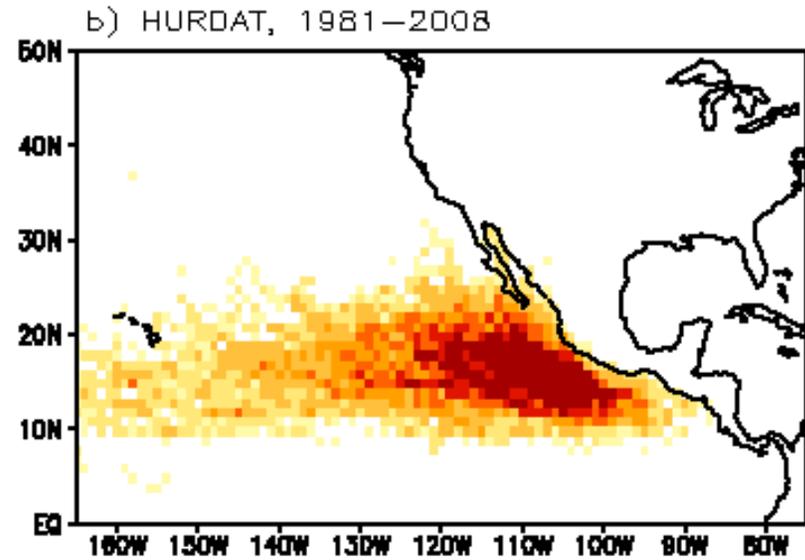
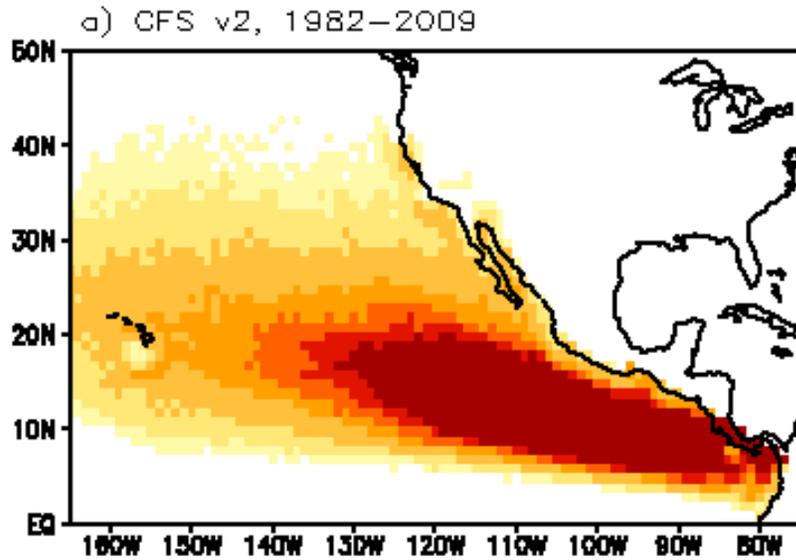
b) HURDAT, 1981–2008



c) CFS T382, 1981–2008

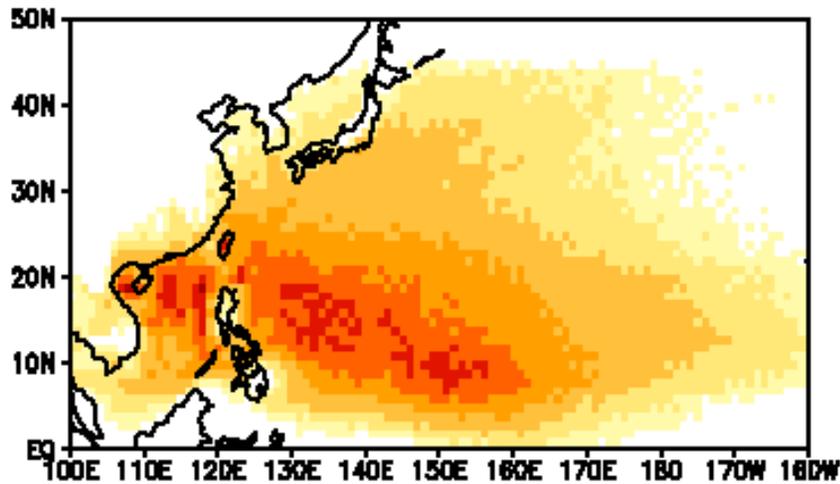


Storm Track Density

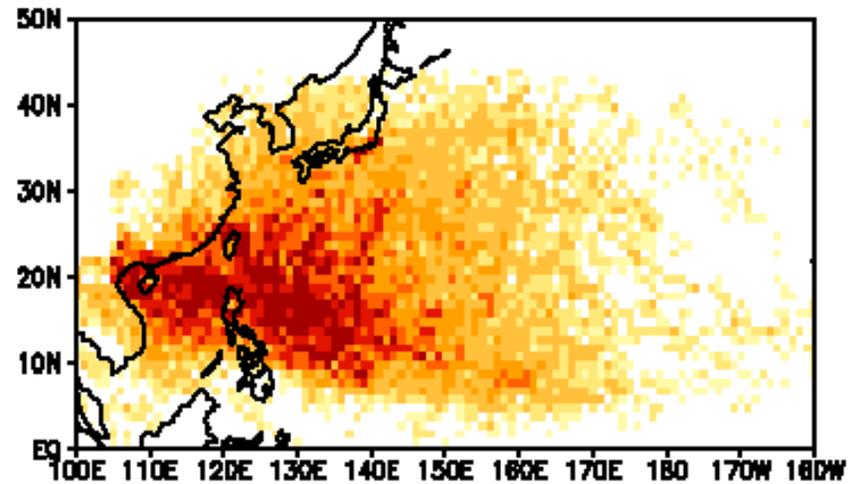


Storm Track Density

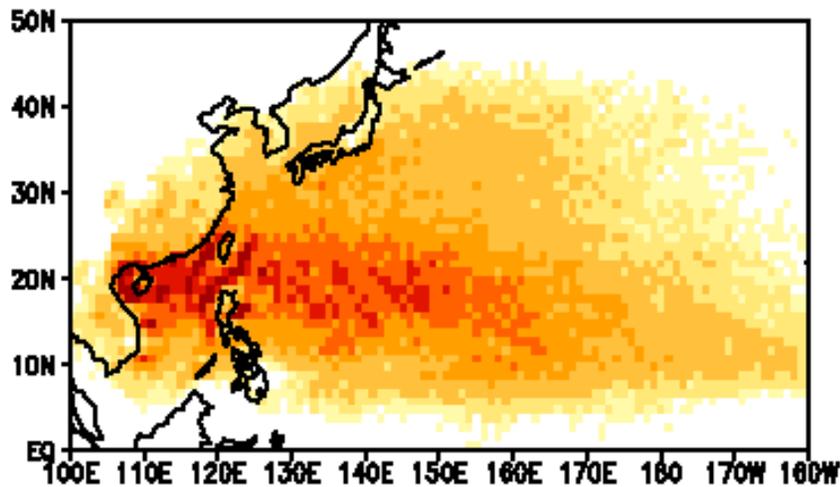
a) CFS v2, 1982–2009



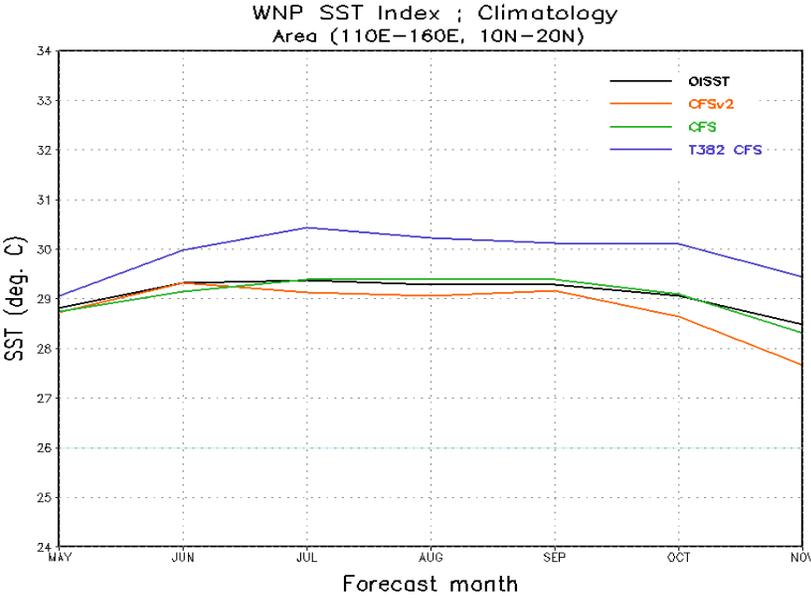
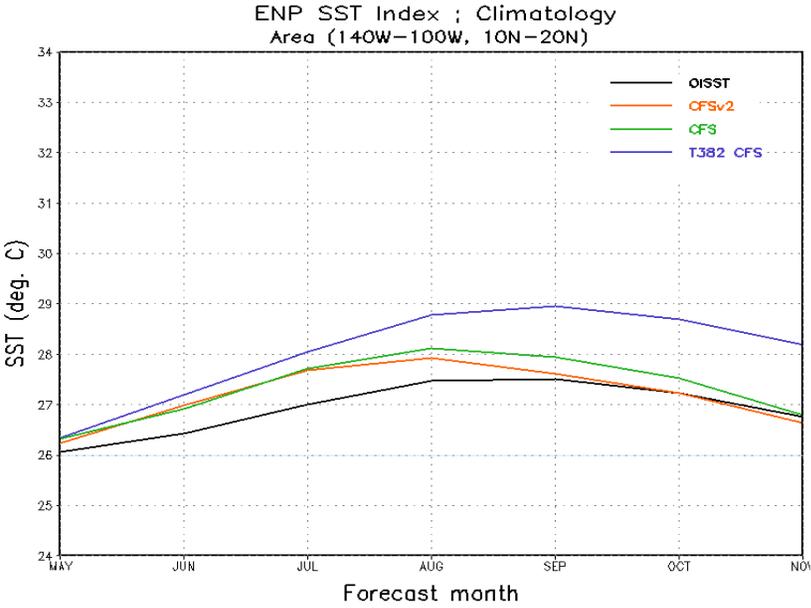
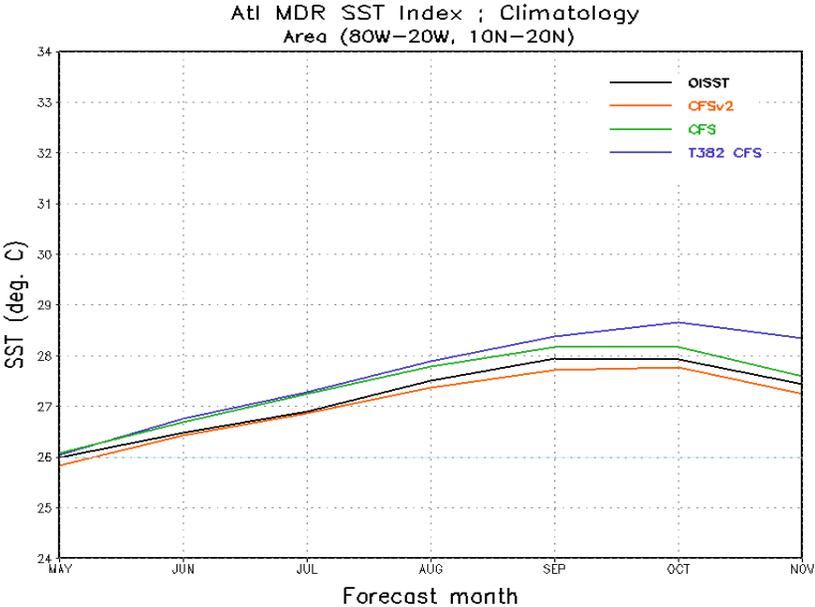
b) CFSR, 1981–2008



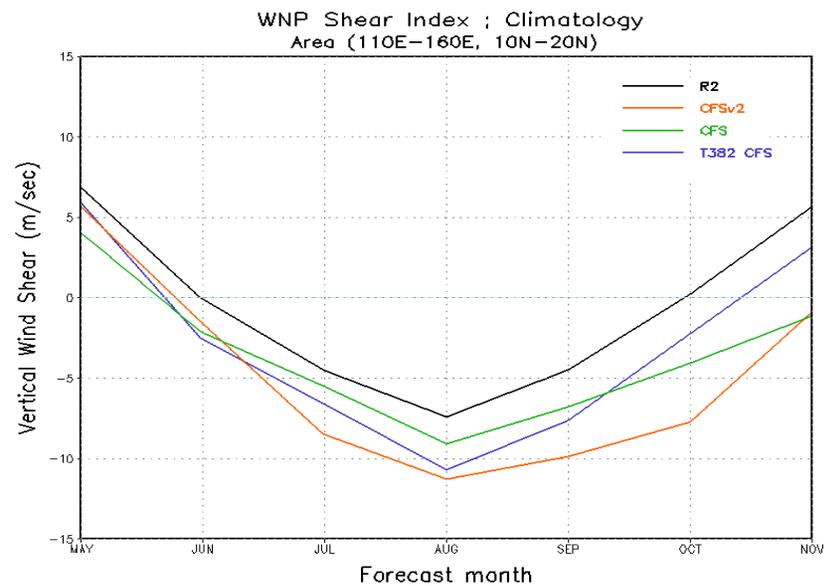
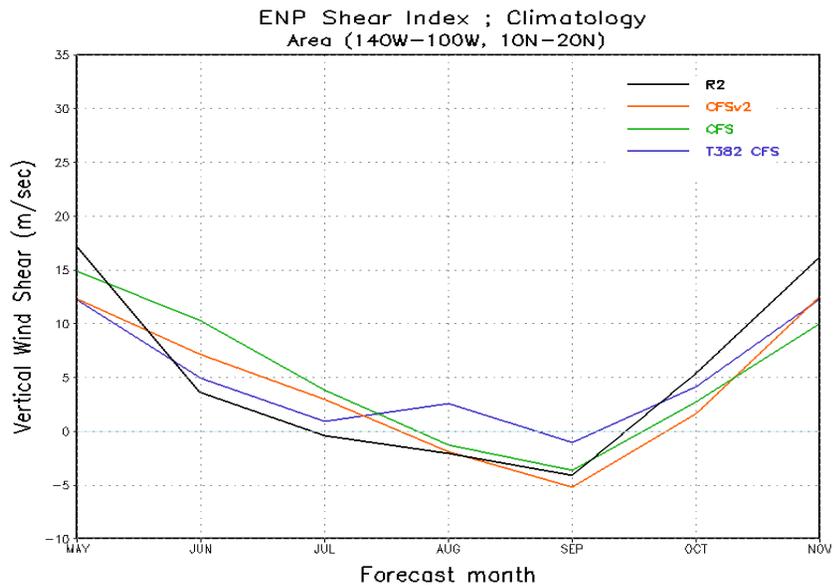
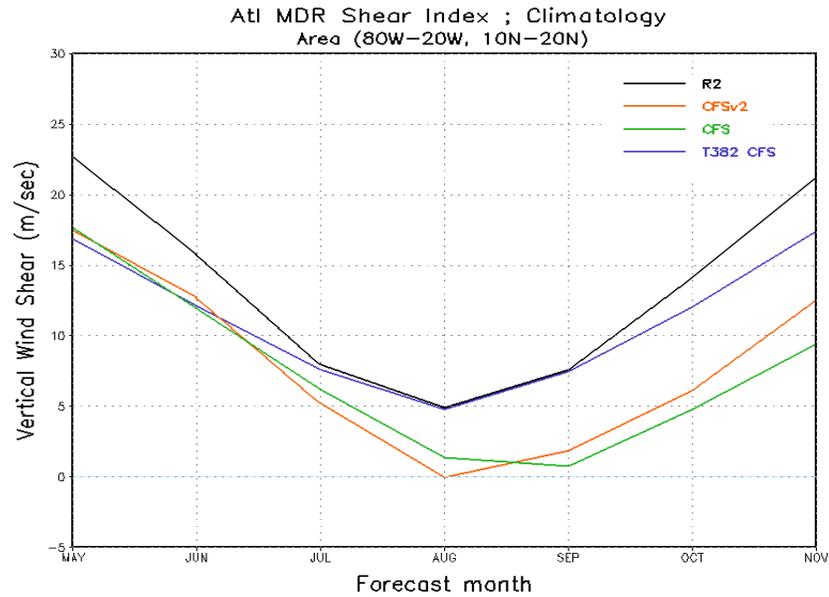
c) CFS T382, 1981–2008



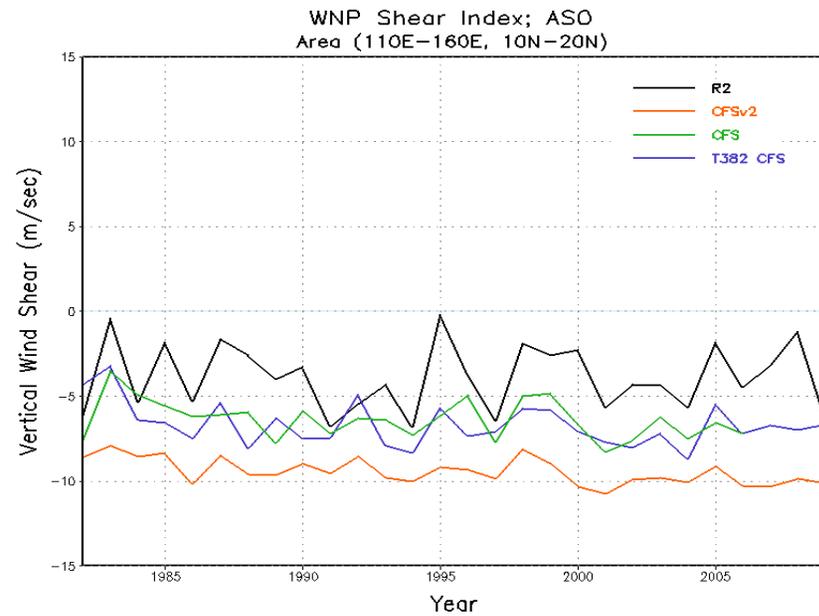
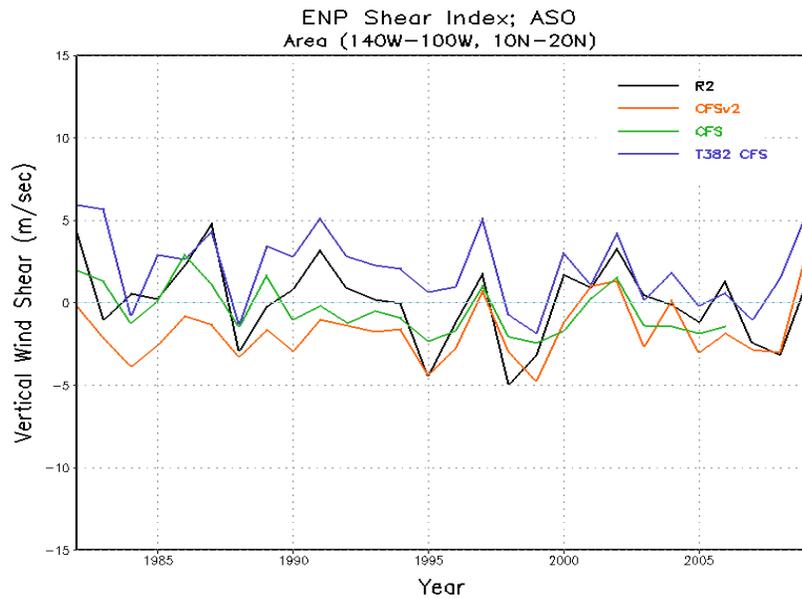
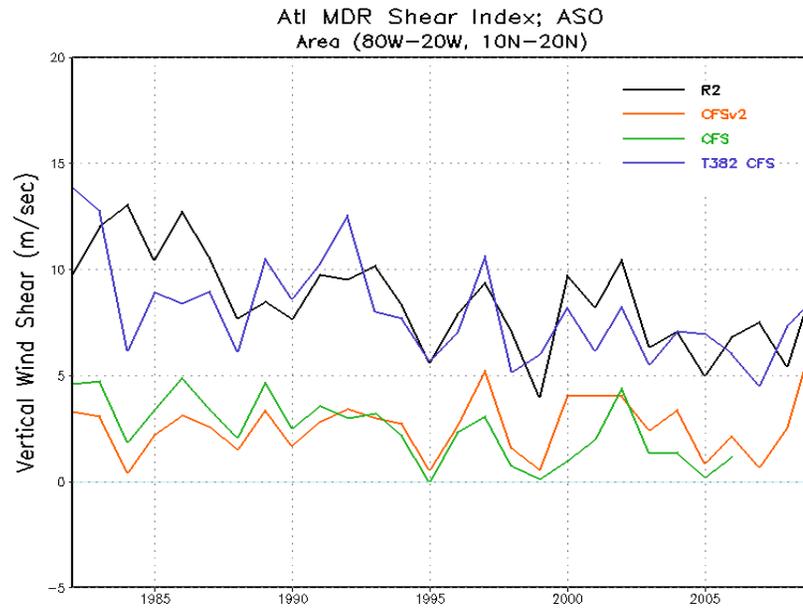
Climatological Seasonal Cycle - SST



Climatological Seasonal Cycle - Wind Shear



Interannual Variability - Wind Shear



Summary

- CFS v2 produces too many storms in ATL, ENP and NI Basins
 - Low interannual variability in storm count
 - Missing Trends
- WNP is better simulated; however, the seasonal cycle peaks too early
- Seasonal cycle in NI shows improvement over CFS T382 hindcasts
- Too many storm formation may be attributed to weak wind shear over the main development regions during the NH storm season